REMARKS

Applicants thank Examiner Havlin for his review of the pending claims. Claims 15-20 are currently pending. Claims 1-14 and 21-26 are canceled. No new matter has been added. In view of the above amendment, Applicants believe the pending application is in condition for allowance.

35 U.S.C. § 112 Rejections

Applicants have canceled claims 21-26 to which this rejection is directed, thereby making this rejection moot. Applicants respectfully request withdrawal of this rejection.

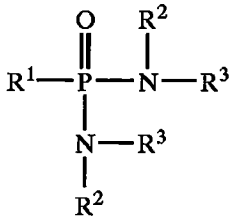
35 U.S.C. § 103 Rejections

The Examiner rejected claims 15-20 as being obvious over Delangle et al. (J. Org. Chem, 1996, v. 61, p. 8904-14) ("Delangle") in view of Alberts et al. (J. Am. Chem. Soc., 1979, v. 101, p. 3545-53) ("Alberts"). Applicants respectfully traverse the rejection.

Claim 15 recites,

A process for extracting a rare earth metal ion from an aqueous solution containing a rare earth metal ion, comprising using as an extraction agent the phosphonamide compound represented by the general formula [1]

[1]



(wherein R^1 represents an alkyl group, a cycloalkyl group, an alkenyl group, a cycloalkenyl group, an alkynyl group, an aryl group, an aralkyl group, or a heterocyclic group, with the proviso

that each group may have a substituent; R^2 represents a hydrogen atom, an alkyl group, a cycloalkyl group, an alkenyl group, a cycloalkenyl group, an aryl group, an aralkyl group, or a heterocyclic group, with the proviso that each group may have a substituent; R^3 represents a hydrogen atom, an alkyl group, a cycloalkyl group, an alkenyl group, a cycloalkenyl group, an aryl group, an aralkyl group, or a heterocyclic group, with the proviso that each group may have a substituent; and the two R^3s may be united to form an alkylene group, a cycloalkylene group or an arylene group).

The Cited References

The references do not render claim 15 obvious because they do not teach or suggest the extracting of rare earth metal ions and they do not teach or suggest the phosphonamide compound of general formula [1].

Delangle exemplifies how one of skill in the art would combine Delangle with Alberts. This is because Delangle itself is a combined teaching of the work of Delangle et al. with Alberts et al. Delangle incorporated the teachings of Alberts, citing it for using a picrate extraction method, to arrive at the disclosure Delangle ultimately published in the *J. Org. Chem.* Delangle discloses the trapping of alkali metal and ammonium cations using a crown-ether-containing phosphonamide. Delangle narrowly describes the types of metals that could be trapped by the crown-ether-containing phosphonamide. Indeed, the narrowness of its disclosure is evidenced throughout the reference. For example, Delangle explains that minor changes in structure can have an impact on the types of metals to which it can form a complex. (Delangle, p. 8904). Additionally, Delangle teaches that certain phosphonamides will not form complexes with any metals at all. Id. Certain phosphonamides, if structurally modified, will exhibit an increase or decrease in the complexing ability to interact with metal ions depending on the modification. (Delangle, pp. 8904, 8908).

Alberts does not broaden the teachings of Delangle. As noted above, Delangle cites Alberts for using a picrate extraction method. Although Alberts used a picrate extraction method to extract a broad range of metal cations, it did so using macrocycles completely devoid of phosphorous, let

alone phosphonamides. (Alberts, 3545-3553). In fact, Alberts discloses the macrocyclic crown ether compounds containing acetylacetone which is what allows the compounds to bind a variety of metal ions. Id.

The Combined References Do Not Teach Extracting Rare Earth Metal Ions

The Examiner states that Delangle teaches metal ion extraction experiments using a methodology to determine the capability of each compound to complex metal ions by quoting, "the capability of receptors 3^{24}, 4, 5 to complex alkali metal and ammonium cations was evaluated by using the picrate extraction method reported by Cram et al." (Delangle, pg. 8911, left column). However, Delangle describes the complexation ability with alkali metal and ammonium cations which can be trapped by crown ether structures. (See Delangle; "18- and 21-membered macrocycles so produced contain a flexible crown ether part and a rigidified phosphoryl binding unit incorporated into the macrocyclic structure. The complexation of these ligands with alkali metal and ammonium cations as guests has been studied in solution. A detailed investigation of their conformation in solution as well as in the solid state is reported.") (Delangle, pg. 8905, left column, lines 13-20). Delangle does not however describe the trapping of rare earth metals as described in claim 15.

When Delangle adopted Alberts' teachings regarding the picrate extraction method and applied them to the crown-ether-containing phosphonamide molecules, Delangle clearly narrowed the types of metals (compared to those disclosed by Alberts) that could be extracted using this method. Delangle limited his teachings specifically to alkali metals and ammonium cations since those exhibited increased complexing capabilities with the crown-ether-containing phosphonamide. (Delangle, pp. 8904, 8908, 8911-12). This is true even though Delangle was well aware of the teachings of Alberts, as evident by the citation thereto. One of skill in the art would not think to broaden the teachings of Delangle because the Delangle reference is replete with remarks that suggest that minor changes in structure can have an impact on the types of metals to which it can form a complex. (Delangle, p. 8904). Alberts does not change this result because the macrocycles of Alberts are so different from the disclosed phosphonamides of Delangle.

The Combined References Do Not Teach The Claimed Phosphonamide Macrocycle

All the phosphonamides taught in Delangle include a macrocyclic conformation with a crown ether moiety. Delangle specifically teaches that the crown ether moiety represents a predominant factor for the ability of a particular macrocycle to complex with an alkali metal and an ammonium cation. (Delangle, p. 8911). Thus, one of skill in the art seeking to modify the phosphonamides would be led away from substituting the crown ether moiety.

Additionally, the phosphonamide incorporated in the crown ether structure of Delangle is distinguishable from the acetylacetone that is introduced into the crown ether structure of Alberts. The compounds of Delangle only trap alkali metal ions or ammonium ions, while the compounds of Alberts exhibit abilities to bind alkali metal ions or ammonium ions as well as other ions. One of skill in the art understands that it is not the phosphonamide but the acetylacetone that is necessary for extracting ions other than alkali metal ions and ammonium ions since the compounds of Alberts are able to bind to these other ions without the presence of phosphonamides.

Thus, in view of these distinguishable characteristics and qualities of the compounds disclosed in Delangle and Alberts, one of skill in the art would not look to the acetylacetone compounds of Alberts to modify the phosphonamide compounds of Delangle to arrive at the claimed process of extraction of rare earth metal ions. This is because one of skill in the art would not expect the phosphonamides in the crown ether structures of Delangle to extract ions other than the expected alkali metal ions and ammonium ions. However, contrary to these references, rare earth metal ions can be extracted using the claimed phosphonamide compound defined as "two R^3s may be united to form an alkylene group, a cycloalkylene group or an arylene group." (Claim 15). These claimed compounds do not have the crown ether structure to trap alkali metal and ammonium ions and are able to trap rare earth metal ions using a phosphonamide compound in contrast to the teachings of Delangle and Alberts. Accordingly, Delangle and Alberts do not render claim 15 obvious as it is drawn to a method of extracting rare earth metal ions unexpectedly from a phosphonamide compound.

What's more, for Delangle molecules **5** and **8** to render claim 15 obvious, the two R^3 groups would have to be united and form a crown ether moiety. However, in claim 15, when the two R^3 groups are joined, the only covered groups are an alkylene group, a cycloalkylene group or an arylene group. As these terms are used by Applicants, they do not cover the crown ether moieties disclosed in the Delangle reference. Alberts does not cure the deficiencies of Delangle because the macrocycles of Alberts do not contain phosphonamides or phosphorous. Therefore, Delangle and Alberts, alone or in combination, do not render claim 15 obvious. Accordingly, Applicants request withdrawal of the rejection.

Dependent claims 16-20 depend from claim 15 and are also not rendered obvious by Delangle and Alberts simply by virtue of their dependency upon claim 15. Withdrawal of the 103 rejection is therefore respectfully requested.

CONCLUSION

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicants believe no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-0013, under Order No. SAE-0030 from which the undersigned is authorized to draw.

Dated: September 25, 2008

Respectfully submitted,

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